“Stand your ground” laws and the demand for legal firearms

Harlan Pittell
Department of Policy Analysis & Management
Cornell University
Ithaca, NY 14853
hrp24@cornell.edu

Policy Analysis & Management Honors Thesis
Research Mentor: Sharon Tennyson

May 7, 2014

Acknowledgements

I express my deepest thanks to Sharon Tennyson for her valuable feedback and excellent supervision over the past year. I would be lost without her direction. I thank Rosemary Avery for guiding me throughout my undergraduate career, and for offering me the privilege of working in her lab. Without this opportunity, I would never have been introduced to the joys of research. I thank my good friends, Jonathan Cantor and Tyseer Siam for their mentorship and always sound advice. I thank José Balmori for helping me with the synthetic control method. I also thank the undergraduate research team for their hard work and constant support. Lastly, I am grateful for the support I have received from my parents and siblings who are always there to cheer me on. All errors are my own

Abstract

Since 2005, 23 states have passed *Stand Your Ground* (SYG) laws: allowing a person to use deadly force in self-defense, even in situations where one can safely flee from an assailant. This study investigates whether SYG laws increased the demand for firearms by using data on background checks for firearms purchases as a proxy for the demand for legal firearms. Results from three alternative difference in differences estimates provide evidence that the passage of SYG laws generally led to an increase in the demand for legal firearms.

Contents

List of Tables

List of Figures

1 Introduction

> America is a country founded on guns. It's in our DNA. It's very strange but I feel better having a gun. I really do. I don't feel safe, I don't feel the house is completely safe, if I don't have one hidden somewhere. That's my thinking, right or wrong.
> *- Brad Pitt*

The shooting of Trayvon Martin on February 26, 2012 sparked a public debate over Stand Your Ground (SYG) laws.[1] While the media has focused on several high profile cases involving SYG, academic research on the broader effects of SYG has been limited. This paper adds to the small body of empirical literature on SYG laws by investigating the economic consequences of SYG. Specifically, this study estimates the effect of SYG on the demand for firearms.

Under the traditional rule of self-defense, a person may only use deadly force as a last resort: a situation where a person cannot safely flee from an aggressor. An exception to this rule exists within the confines of one's home. The Castle Doctrine permits a person to use deadly force against a home intruder, regardless of whether such force is necessary (Dressler, 2006). SYG laws expand the Castle Doctrine outside the home: allowing a defender to use deadly force against an aggressor in any place he or she has a legal right to be, even in cases when a defender believes he or she can reasonably flee from an

[1] For example, see the following articles Shot to Death in Florida (New York Times), Florida's Disastrous Self-Defense Law (New York Times), Trayvon Martin's Death Puts Florida's 'Stand Your Ground' Law Under New Scrutiny (ABC), The political battle over 'Stand Your Ground' laws (The Washington Post), Florida shooting renews debate over 'stand your ground' laws (CNN).

assailant. Following the passage of Florida's SYG law in 2005, 21 states have enacted similar legislation.[2]

Why study SYG laws and the demand for firearms? As exemplified in the epigraph, Americans love guns. Americans own between 262 and 310 million firearms—nearly one gun per capita (Hill, 2013). Civilians in the U.S. own more guns per capita than civilians in any other country (Small Arms Survey, 2011). In addition, guns are a highly contentious political issue.[3] One factor that influences gun ownership in the US is the political environment. For example, one recent study finds that the election of President Obama led to a surge in the demand for firearms (Depetris-Chauvin, 2014). This paper investigates whether SYG laws led to a greater demand for firearms. This is important because an increase in gun ownership has societal implications—which can be positive or negative depending on one's views.

The remainder of this paper is organized as follows. Section 2 discusses the legal framework for SYG laws, as well as previous empirical research on SYG and the demand for firearms. Section 3 describes the data used in this study. Section 4 discusses the methods used in the empirical analysis. Section 5 presents and discusses results. Section 6 concludes the paper.

[2] Interestingly, Utah passed its SYG law in 1994 and is the only state to enact a SYG law prior to Florida.
[3] In 2013, two Colorado legislators were recalled for supporting stricter gun control legislation. Specifically, they sought to ban magazines with over fifteen rounds of ammunition, and advocated for a universal background check, and a requirement that buyers pay a fee for each background check.

2 Background

2.1 Overview of SYG laws

The traditional rules of self-defense

When may deadly force be used in self-defense? Under the "traditional rule of self-defense"(Green, 1999) a non-aggressor is justified in using deadly force if he "reasonably believes such force is necessary to protect himself from imminent use of unlawful force by the other person"(Dressler, 2006). The justified use of deadly force requires the presence of three elements: 1) *necessity*; 2) *proportionality*; and 3) *reasonable belief***.**

Necessity restricts the use of deadly force to a means of last resort where deadly force may only be used "to the extent that it is necessary." Dressler (2006) illustrates necessity with the following hypothetical: "[I]f V, an elderly or infirm aggressor, attempts to stab D, D may not kill V if D knows or should know that he could avoid death by disarming V, or by using *non*-deadly force." Within the principle of necessity lies the *duty to retreat*. If a person believes he can safely flee from an aggressor, he may not respond using deadly force. Returning to Dressler's example, D may not shoot V if D believes that he can safely retreat from his attacker.

Proportionality prohibits a defender from using "excessive [force] in relation to the harm threatened [by the aggressor]" (Dressler, 2006). In adherence to this principle, a person may respond to a deadly threat using either lethal or non-lethal force. However, a person may not respond to a non-deadly threat using lethal force. Dressler illustrates proportionality with the following hypothetical: "[I]f V threatens to strike D on a public

road, and the only way D can avoid the battery is to push V into the street in front of a fast-moving car, D must abstain and seek compensation for the battery after the fact" (Dressler, 2006).

The reasonable belief component requires that a person hold, "a reasonable (even if incorrect) belief that the use of force is necessary and proportional to the supposed threat" (Dressler, 2006). This requirement consists of two prongs: 1) a person must truly believe that deadly force is necessary and proportional to counter or respond to an imminent and unlawful threat; 2) a reasonable person would possess a similar belief to the defender under the same circumstances.

The Castle Doctrine

Returning to the element of necessity, the C*astle Doctrine* provides an exception to the duty to retreat. The Castle Doctrine is a universally recognized principle that eliminates a non-aggressor's duty to retreat before using deadly force while defending his home—even if he believes he can safely flee the premises. For example, if one encounters an unarmed robber inside his home, such a person may use deadly force against the intruder, even if the resident does not believe the intruder poses a threat to his life.

Dressler (2006) cites two rationales for the Castle Doctrine. First, the home is like a castle. It provides shelter to those who reside within its walls. A person should not be forced to retreat further than his home, "for where shall a man be safe if it be not in his house?" Second, the home is a source of privacy, which creates an element of sanctity.

According to Dressler, "[w]hen a wrongdoer seeks to enter a person's dwelling . . . more than property is invaded."

Stand Your Ground laws

SYG laws further expand the traditional rule of self-defense. They remove the duty to retreat from any place a person has a legal right to be, and have been described as expansions to the Castle Doctrine.[4] These laws turn the traditional rules of self-defense on its head; "they expand the [Castle Doctrine] to apply everywhere making it the rule instead of the exception" (Mayors Against Illegal Guns, 2013).

For example, SYG laws prevent law enforcement from arresting shooters who claim self-defense, unless they have probable cause that the shooter used unlawful force. Consequently, officials who improperly detain persons who claim self-defense may face wrongful arrest lawsuits. Many SYG laws further protect shooters with provisions that prevent criminal or civil cases from proceeding without first holding an *immunity hearing*. During a pretrial immunity hearing, both sides present evidence to a judge who determines whether the shooter's actions were protected under the self-defense law (i.e., did the shooter act in self-defense?). If the judge rules in favor of the shooter, no criminal or civil trial can proceed. Otherwise, the case proceeds to trial.[5]

[4] The American Legislative Exchange Council (ALEC) titled its model SYG law the *Castle Doctrine Act*, and this model served as the template for many states' SYG laws.

[5] George Zimmerman waived his right to a pre-trial immunity hearing, but the jury was instructed to consider Florida's SYG law, which they found applicable to Zimmerman.

A number of states also protect shooters who claim self-defense from civil suits. Eleven states provide *blanket immunity* from any form of civil litigation (Mayors Against Illegal Guns, 2013). These states bar anyone from bringing a civil suit against a person who uses deadly force in self-defense—including injured bystanders and their dependents. Other states offer partial immunity for persons who invoke SYG laws, barring only an aggressor or his relations from filing a civil action. In these states, civil suits can still be filed on behalf of injured bystanders and their families.

Since Florida passed its SYG law in 2005, 22 states have passed similar SYG laws. Table 1 provides a list of these states, as well as the effective dates of their SYG laws. A majority of these states enacted their SYG laws over a two year period, between 2005 and 2007. Figure 1 illustrates how the number of states with SYG laws sharply increased between 2005 and 2013. The National Rifle Association (NRA) and the American Legislative Exchange Council (ALEC) are two organizations that lobbied state legislatures to adopt SYG laws. Nugent-Borakove (2007) provide the following theories about what prompted Florida to adopt its SYG law:

- Events like 9/11 and Hurricane Katrina diminished beliefs in public safety. Residents may have sought additional protections for use of deadly force in self-defense following a future disaster.
- Many people developed a lack of confidence in the criminal justice system after a number of high profile cases highlighted the vulnerability of some victims of

domestic violence. They believed that would-be victims of domestic violence, or similar crimes, need to acquire weapons to defend themselves should the need arise.

- Over the past decade the political environment has shifted in favor of a loosening of gun restrictions. Particularly, the federal ban on assault rifles expired in 2004, and the Supreme Court ruled a ban on handguns unconstitutional in 2008.

While some state laws expand the Castle Doctrine outside the home, not all SYG states extend the Castle Doctrine to any place a person has a legal right to be. *Partial* SYG laws remove the duty to retreat from a person's vehicle or place of work. Table 2 provides a list of partial SYG states, as well as the effective dates of these laws.[6] For this analysis, I focus on full SYG states, which have expanded the Castle Doctrine to any place a person has a legal right to be. I do not consider provisions regarding criminal or civil immunity in this definition.

Proponents of SYG

Proponents assert that self-defense is "a fundamental human right" (NRA, 2013). People who use deadly force in self-defense should not worry about facing criminal or

[6] In addition, several states have expanded the Castle Doctrine through case law, but not through legislation. For example, in the state of Washington there is no duty to retreat where any person has the legal right to be. See, State v. Redmond, 150 Wn.2d 489 (2003) "there is no duty to retreat when a person is assaulted in a place where he or she has a right to be."

civil charges. Representative Dennis K. Baxley sponsored Florida's SYG law in 2005, and offers the following anecdote about why SYG laws are necessary:

> The catalytic event that led to the legislation's passage . . . was the looting of property in the aftermath of hurricanes. Specifically, there was a situation…where a citizen moved an RV onto his property, to protect the remains of his home from being looted. One evening, a perpetrator broke into the RV and attacked the property owner. The property owner, acting in self defense in his home, shot and killed the perpetrator. It was months before he knew whether he would be charged with a crime because there was no clear legal definition of self defense in such a case or of when a potential victim was required to retreat (Baxley, 2012).

Along these same lines, John Lott argues that SYG laws benefit those who live in high-crime urban areas, where police cannot always respond in time to protect victims (John R. Lott, 2013). SYG laws make it easier for would-be victims to protect themselves under these scenarios, especially in situations where retreating could be dangerous.

Critics of SYG

Critics argue that "shoot first" laws lower the costs of using deadly force, which can lead to violent outcomes in situations "that just as easily might have ended with someone walking away" (Law Center to Prevent Gun Violence, 2013). Many of these critics argue for the repeal of SYG laws. The Association of Prosecuting Attorneys (2012) has raised concerns that SYG laws: "may inhibit the ability of law enforcement and prosecutors to hold violent criminals accountable; may encourage vigilante behavior; and, in some circumstances, may put law enforcement lives at greater risk." The Law Center to Prevent Gun Violence (2013) echoes these concerns: "[s]hoot first laws encourage people to take the law into their own hands and act as armed vigilantes, often with deadly

consequences." They further argue that SYG laws become exponentially more dangerous when paired with concealed carry laws—laws that allow a person to carry a hidden, loaded handgun in public places.

Critics also assert that SYG laws are "irrefutable" (Mayors Against Illegal Guns, 2013). If the victim is dead, authorities must accept a shooter's claim at face value in cases lacking witnesses or recordings. This is especially problematic in states that prevent law enforcement from arresting a shooter unless they have probable cause to believe that the shooter used unlawful force.

2.2 Prior research on Stand Your Ground

While the media has debated the merits of Stand Your Ground laws, academic research is limited to a handful of studies. Two studies focus on the effect of SYG laws on crime rates. Cheng and Hoekstra (2012) investigate the impact of SYG laws on crime rates in all 50 states. They conduct a difference-in-differences analysis using data from the FBI Uniform Crime Report (UCR). Their results provide little evidence that SYG laws deter burglary, robbery, or aggravated assault. Instead SYG laws appear to increase rates of murder and non-negligent manslaughters. Similarly, Ren, Zhang, and Zhao (2012) investigate whether the 2007 Joe Horn shooting deterred crime in Houston and Dallas, Texas.[7] They conduct a time-series analysis using data on daily burglaries from each city's

[7] On November 14, 2007 Joe Horn called 911 to report that he saw two burglars breaking into his neighbor's home. In his conversation with an emergency dispatcher, Joe Horn referred to Texas's recently enacted SYG law, and voiced his concern about letting the burglars get away. Armed with a shotgun, Joe Horn exited

police department. Their results tell a tale of two cities: in Houston, residential and business burglary rates dropped after the shooting, but in Dallas, no significant changes in burglary rates occurred. These results indicate the presence of a "place-conditioned" deterrent effect, given that the Joe Horn shooting occurred in vicinity of Houston.

McClellan and Tekin (2012) focus on the effects of SYG laws on homicides and firearm injuries. They conduct a difference-in-differences analysis to discern how the passage of SYG laws affected rates of homicides and firearms injuries in each state.[8] Their results indicate that SYG laws increased homicides of white males, but had no consistent effect on homicides of blacks. Furthermore, they analyze the causes behind the increase in homicides to determine whether the increase is driven by an increase in justifiable homicides (criminals killed by private citizens) or non-justifiable homicides (murder). They conclude that non-justifiable homicides are the driving factor behind the increase in homicides. This suggests that SYG laws do not lead to more justified killings of assailants. Lastly, they investigate the impact of SYG on firearm-related injuries. They conclude that SYG laws significantly increase the number of emergency room visits and hospital discharges related to firearm inflicted injuries.

---

his home and confronted the burglars, despite being told by the emergency dispatcher to "not go outside the house." Joe Horn then shot and killed the two burglars, claiming he had "no choice." Subsequently, a Grand Jury cleared Joe Horn of all charges in June, 2008.

[8] Data on homicides comes from the U.S. Vital Statistics and the Supplemental Homicide Reports. Data on firearm injuries comes from the Health Care Utilization Project.

2.3 Explaining gun ownership

Guns have two legitimate uses: protection and sport. Protection describes guns owned for self-defense, while sport encompasses a broader range of activities, like hunting, target shooting, and collecting. Cao, Cullen, and Link (1997) provide a foundation for my conceptual model of the demand for firearms. Their framework identifies six factors that offer explanations for why people choose to acquire firearms: 1) normal goods; 2) socialization; 3) personal experience; 4) collective security; 5) attitudes and beliefs; and 6) education.

First, guns are normal goods. With more income, people can afford to purchase more firearms (Cao et al., 1997). While a low-cost market for firearms exists, (Mercy & Rosenberg, 1998; Smith, 1996; Wilkinson, McBryde, Williams, Bloom, & Bell, 2009), there is a positive relationship between income and firearm ownership (Glaeser & Glendon, 1998; John R Lott, 2013; Luxenburg, Cullen, Langworthy, & Kopache, 1994).

Second, socialization influences gun ownership through exposure to shared norms, values, and beliefs. According to Cao, "people possess firearms if they have been in social situations in which they have learned pro-gun values." A number of studies find higher rates of gun ownership in the South and rural areas (Glaeser & Glendon, 1998; John R Lott, 2013), and these areas are generally thought to have strong gun cultures (Cao et al., 1997). Similarly, having friends and peers who own guns also increases the likelihood of owning a gun (Cunningham, Henggeler, Limber, Melton, & Nation, 2000; Glaeser &

Glendon, 1998; Lizotte, Tesoriero, Thornberry, & Krohn, 1994). Lastly, socialization is thought to play a role in differences in gun ownership across gender, race, and age groups (Cao et al., 1997). Specifically, males, whites, and older persons are significantly more likely to own firearms (Edward L Glaeser, 1998).

Third, personal experience plays a role in gun ownership. Cao et al. (1997) conclude that persons who are victims of crime are more likely to own guns for protection. Other studies find similar results (DeJong, 1997; Kleck & Kovandzic, 2009; Legault & Lizotte, 2009; Lizotte & Bordua, 1980; Lizotte, Bordua, & White, 1981). However, other experiences, like serving in the military, do not significantly impact the likelihood of owning a firearm (Lizotte & Bordua, 1980; Lizotte et al., 1981).

Fourth, collective security impacts gun ownership. People who live in safer areas are less likely to own guns. For example, a number of studies conclude that increases in law enforcement officers negatively correlate with gun ownership (Edward L Glaeser, 1998; Kleck & Kovandzic, 2009; Young, McDowall, & Loftin, 1987). Similarly, Cao et al. (1997) finds evidence that increases in informal collective security—the belief that neighbors will provide assistance against criminal victimization—reduces protective gun ownership.

Fifth, political attitudes and beliefs also influence gun ownership. The political environment can have significant effects on the demand for firearms, as demonstrated by Depetris-Chauvin (2014). Chauvin studies the Obama effect and finds that the election of

President Obama led to a spike in the demand for firearms. Similarly, Kleck, Kovandzic, Saber, and Hauser (2011) find that people with conservative ideologies have higher rates of gun ownership. Likewise, people with less faith in public institutions, such as courts and the federal government, are more likely to own guns (Glaeser & Glendon, 1998; Jiobu & Curry, 2001). However, gun ownership does not appear linked to violent attitudes (Dixon & Lizotte, 1987; Kleck, 2005; O'Connor & Lizotte, 1978).

Sixth, education impacts gun ownership. In general, schools do not promote violence or the use of weapons, so people with more education should be less likely to own guns (Cao et al., 1997). A number of studies find evidence that education negatively correlates with gun ownership (Glaeser & Glendon, 1998; Jiobu & Curry, 2001; Lizotte et al., 1981).

2.4 The effect of SYG laws on the demand for firearms

SYG laws lower the cost of using deadly force by decreasing the likelihood that a defender will face criminal or civil penalties for the use of deadly force, regardless of whether his actions are right or wrong. According to the law of demand, a decrease in cost generally leads to an increase in demand. As a result, SYG laws should lead to a greater demand for firearms, ceteris paribus.

3 Data

3.1 Estimating the demand for firearms

I estimate the demand for firearms using data from the FBI on the *National Instant Criminal Background Check System* (NICS). The NICS performs background checks on persons in all states that seek to purchase firearms from gun stores or other Federal Firearms Licensees (FFLs).

Before purchasing a firearm from an FFL, a buyer must complete form 4473, "which is effectively an application to the federal government to buy a weapon" (Jeunesse, 2013). On this form the buyer certifies under penalty of perjury that he is purchasing the firearm for himself and not "acquiring the firearm(s) on behalf of another person."[9] In addition, the buyer also indicates that he is not prohibited from purchasing a firearm under federal law.[10] After the buyer completes form 4473, the seller must contact the NICS Section to verify the buyer's eligibility.[11] The NICS Section searches for the buyer's name in three databases.[12] If a valid match turns up, the seller may not proceed with the transaction. In over 90% of cases, the NICS Section determines a buyer's eligibility immediately (NICS,

[9] To view the rest of ATF Form 4473 see www.atf.gov/files/forms/download/atf-f-4473-1.pdf

[10] Categories of persons who are generally prohibited from purchasing or possessing firearms under federal law include: felons, illegal aliens, and persons with mental illnesses.

[11] In Point of Contact (POC) states, the seller contacts a designated state agency to conduct the background check, rather than the NICS Section.

[12] These databases are the National Crime Information Center (NCIC), which contains information on wanted persons and protection orders; the Interstate Identification Index (III), which contains criminal history records; and the NICS Index. The NICS Index contains information that may not be available in the NCIC or the III regarding persons predetermined to be prohibited from receiving firearms under federal or state law.

2012). In situations where more information is needed, the NICS Section can delay the sale for up to three business days.[13]

The FBI publishes the number of monthly NICS background checks it has conducted in each state since December 1998.[14] For this study, I use NICS data from January 2000 through December 2012. To more easily compare background checks across states, I convert my data into a rate per 100,000 persons using annual population estimates from the Census Bureau.

Compared to other measures of gun ownership, the NICS confers four key advantages. First, data on the NICS is available at the state and monthly levels.[15] Second, the NICS is collected in close proximity to actual gun purchases. In contrast, surveys of gun ownership may be prone to measurement error, especially when they rely on self-reports. Third, the NICS stems from individual-level decisions to purchase firearms.[16] Fourth, unlike measures of firearm mortality, the NICS is not an outcome of gun ownership.

Despite its merits, the NICS is not a perfect measure of demand for firearms. First, data in the NICS only measures guns sold by licensed retailers in the primary market,

[13] If the FFL does not received a response from the NICS Section, the FFL may proceed with the firearms transfer. In cases where an FFL proceeds with the transaction, but later receives a deny decision after the lapse of three business days, the ATF is responsible for retrieving the firearm from the buyer.
[14] This data is available at www.fbi.gov/about-us/cjis/nics/reports/.
[15] In contrast, a number of studies use data from the General Social Survey (GSS), which only provides regional and annual measures of gun ownership.
[16] In contrast, the GSS only provides a measure of gun ownership at the household level.

which omits firearms transfers that occur in the secondary markets.[17] Firearms sales on the secondary market generally do not require background checks, such as purchases from individual attendees at gun shows.[18] Philip Cook estimates that 40% of all firearms transactions occur on the secondary market, which means a significant portion of gun transfers may occur without background checks (Cook, Molliconi, & Cole, 1995).[19] Similarly, data on the NICS also does not consider illicit gun transfers that occur in underground firearm markets.

3.2 Stand Your Ground

My primary explanatory variable is the presence of a SYG law. I identified the effective date of SYG laws from state legislative websites. I created two indicator variables of SYG. My first variable indicates the presence of a full SYG law, and my second variable indicates the presence of a partial SYG law.[20] I assigned an observation a value of one in a month and year where a state had a SYG law in effect, and a value of zero otherwise. If a state passed a SYG law on a day other than the first of the month, I coded the entire month as one.[21]

---

[17] The primary market for firearms refers to firearms sold by FFL's. In contrast, the secondary market for firearms encompasses sales between private parties, such as individual sellers at gun shows (Cook, 1995).
[18] A number of states have exemptions to this rule, and require NICS background checks for all firearms transfers. A table of these states can be found in the appendix.
[19] Other studies of gun ownership have also found an approximately 60/40 split between the primary and secondary markets.
[20] My indicators of full and partial SYG states are mutually exclusive from one another. A state with a full SYG law is not also deemed a partial SYG state.
[21] In addition, I performed robustness checks by recoding SYG in these months as zero and the proportion of days SYG was in effect that month. My overall results remained unchanged.

3.3 Additional controls

I include a number of controls in my analysis in order to account for other factors that influence the demand for firearms, as outlined in my conceptual model. Because the empirical literature shows that gun demand varies by race, age, and gender, I control for differences in state demographics using data from the Census Bureau. Specifically, I use annual population estimates of: gender (male and female); race (white, black, and other race); ethnicity (Hispanic and non-Hispanic); and age (<30, 30-39, 40-49, 50-59, 60+). Similarly, to account for the impact of education on the demand for firearms, I control for differences in high school and college graduation rates across states, using data from the American Community Survey (ACS).[22]

I include controls for personal income and unemployment to account for economic differences across states, which impact the demand for firearms. I obtain data on total quarterly personal income in each state from the Bureau of Economic Analysis. Data on seasonally adjusted unemployment comes from the Bureau of Labor Statistics.

To control for differences in criminal victimization and collective security, I include data on state law enforcement and violent crime rates. Data on the number of law enforcement officers and violent crimes committed in each state and year comes from *Crime in the United States*.[23,24]

---

[22] The ACS is an annual survey conducted by the U.S. Census Bureau that provides insight on changes in demographics in American communities. For more information see www.census.gov/acs.

[23] *Crime in the United States* is an annual publication by the FBI drawn from the Uniform Crime Report.

[24] Violent crime consists of murder, forcible rape, robbery, and aggravated assault.

Lastly, I control for political attitudes by including data on the political environment at the federal and state levels. At the federal level, I include an indicator variable of the election of President Obama. This accounts for the spike in NICS background checks that occurred following the election of President Obama, as discussed by Depetris-Chauvin (2014). I code the control for President Obama as one in months after his election (November 2008), and as zero in months prior. At the state level, I control for the political party of the governor, as well as the composition of the lower house of state legislature. This data comes from the University of Kentucky Center for Poverty Research. Political party of governor is a binary variable, where one represents a Democratic governor, and zero otherwise. My control for state house corresponds to the fraction of Democrats elected to the lower house of a state's legislature in a given year. Summary statistics for all of the control variables can be found in Table 3.

4 Empirical analysis

I use three empirical approaches to compare the demand for firearms in states with SYG laws (the treated group) to states without SYG laws (the control group). Were I to only examine changes in the demand for firearms within the treated group, I would fail to account for other variables that influence the demand for firearms. To address this shortcoming I include a control group in my analysis. Demand in the control group serves as a proxy for demand in the treatment group absent the passage of a SYG law. I take advantage of variation in self-defense law across states and time and test for effects of SYG using three comparison sets:

1) North Carolina and South Carolina (SYG);
2) All states with and all states without SYG laws;
3) All states with SYG laws and their respective synthetic control states.

Each approach is discussed in detail below.

4.1 North and South Carolina

First I examine the impact of SYG in the Carolinas using a difference-in-differences approach. I use monthly data between December, 2004 and December, 2007. This time frame begins 18 months before South Carolina enacted its SYG law and extends 18 months after its enactment. I use North Carolina as a counterfactual for two reasons. First, these two states have a similar demographic composition—see Table 4. Second, North and South Carolina have similar trends in NICS background checks during the pre-treatment period—see Figure 2.

I represent the empirical model with the following equation:

$$D_{smy} = \alpha + \beta[SYG]_{my} + \gamma[SC]_s + \delta[SC \times SYG]_{smy} + \mu_m + \mu_y + \varepsilon_{smy} \quad (1)$$

where D_{smy} is the demand for firearms in a given state (s), month (m), and year (y). α is the constant. $[SYG]_{my}$ is the estimated coefficient times an indicator of the treatment period; $[SC]_s$ is a coefficient times an indicator of South Carolina. $[SC \times SYG]_{smy}$ is a coefficient times an indicator of South Carolina during the treatment period. μ_m are month fixed effects, and μ_y are year fixed effects. Lastly, ε_{smy} is the error term.

The main advantage of this approach is North Carolina's resemblance to South Carolina, which makes a good estimate of the demand for firearms in South Carolina absent SYG. As a result, this approach controls for other factors that influence the demand for firearms— even those that are unobserved. However, this analysis comes from a small number of observations, which limits the statistical power. In addition, results may not generalize beyond the Carolinas, since they do not speak to the U.S. as a whole. My subsequent analysis minimizes these drawbacks.

4.2 Statewide analysis

Next I analyze the impact of SYG on monthly demand for firearms in 48 states between the years 2000 and 2012.[25] I use a similar identification strategy as in my previous analysis. I compare demand for firearms between SYG and non-SYG states, before and

[25] I omit Kentucky because it conducts monthly background checks of all firearm permit holders, which greatly inflates its monthly NICS totals. I omit Utah because it has had a SYG law throughout the entire time frame of this analysis.

after the enactment of a SYG law. However, because not all states are similar this analysis requires controls for other factors that influence the demand for firearms in each state. I include these controls in order to distinguish the impact of SYG from other factors that influence the demand for firearms. I represent this model with the following equation:

$$D_{smy} = \alpha + \beta[SYG]_{smy} + \gamma[X]_{sy} + \delta[Y]_{sqy} + \vartheta[Z]_{smy} + \mu_s + \mu_m + \mu_y + \varepsilon_{smy} \quad (2)$$

where D_{smy} is the demand for firearms in a given state (s), month (m), and year (y). α is the constant. $[SYG]_{smy}$ is an indicator of SYG. $[X]_{sy}$ is a vector of annual state-level control variables. $[Y]_{sqy}$ is a vector of quarterly state-level control variables. $[Z]_{smy}$ is a vector of monthly state-level control variables. μ_s are state fixed effects, μ_m are month fixed effects, and μ_y are year fixed effects. Lastly, ε_{smy} is the error term.

The strengths and weaknesses of this approach are the opposite of those from the previous analysis. By using data on most states, these findings are generalizable to the US as a whole. In addition, data in this analysis contains a larger number of observations, which strengthens the statistical power of this analysis. However, this approach relies on a weaker counterfactual for SYG states. While I control for many variables that influence the demand for firearms, other confounding variables may be unaccounted for, thereby biasing my results. These shortcomings segue to my analysis of SYG using the synthetic control method.

4.3 Synthetic Control method

I utilize the synthetic control method (SCM) to construct annual estimates of demand for firearms in artificial states that function as a control group. The SCM is a novel econometric approach that draws on the strengths of both of my previous approaches. The primary advantage of this method is that "it provides a better comparison for the unit exposed to the intervention than any single unit alone" (Abadie, Diamond, & Hainmueller, 2011). Abadie and Gardeazabal (2003) introduced this method in their analysis of the economic consequences of terrorism in the Basque Country. This approach involves two steps. First, synthetic control units are created from a weighted average of all possible control units. Second, synthetic control units are compared to the treated units during the pre and post-treatment periods—similar to a traditional difference-in-differences analysis. The authors describe the approach as follows:

> Synthetic control methods involve the construction of synthetic control units as convex combinations of multiple control units. The weights that define the synthetic control unit are chosen such that the synthetic control unit best approximates the relevant characteristics of the treated unit during the pretreatment period. The post-intervention outcomes for the synthetic control unit are then used to estimate the outcomes that would have been observed for the treated unit in the absence of the intervention (Abadie et al., 2011, p. 2).

I apply the SCM to the 13 states that enacted SYG laws between 2005 and 2007.[26] However, I limit my analysis to 6 states: Alabama, Arizona, Florida, Kansas, South

[26] I limit my analysis to this time frame in order to eliminate the "Obama effect" as discussed by Depetris-Chauvin (2014). By doing so I am able to create synthetic control states that more closely resemble the real states during the pretreatment period.

Carolina, and Texas. This is because in these states, demand for fireams in the synthetic states closely resembled demand for firearms in the treated states during the pre-treatment period. Once synthetic controls are constructed for each state, I compare the difference in demand for firearms in each state and its control state, before and after the passage of SYG laws. Because each synthetic control state is constructed to closely match a treatment state, comparison can be undertaken by regressing the difference in firearms demand on an indicator for SYG. I represent this application of the SCM using the following equation:

$$D_y = \alpha + \beta[SYG]_y + \varepsilon_y \quad (3)$$

Where D_y represents the difference in the average demand for firearms between a treated state and its synthetic counterpart, α indicates the constant, and $[SYG]_y$ indicates the presence of a SYG law. ε_y is the error term.

To construct my synthetic control states, I first aggregated NICS data on demand for firearms to the annual level by averaging NICS across months in a year, in order to decrease noise in the dataset.[27] Next, I constructed synthetic control states from a weighted average of demand for firearms in non-SYG states. To do so I used Synth, a STATA package created by Alberto Abadie, Alexis Diamond, and Jens Hainmueller.[28] This program is based on the synthetic control method used in their previous papers. In

[27] This step mitigated the noise from monthly fluctuations in background checks due to permit.
[28] The Synth package is available at www.stanford.edu/~jhain/synthpage.html

Synth I inputted the predictors for the demand for firearms for each potential control state and year, to construct weights for each treated state's synthetic control. Synth then returned: 1) the weights it used to construct each synthetic control state;[29] and 2) a dataset with background checks in the real and synthetic states over the entire time frame.

I then compared the demand between real and synthetic states before and after the passage of SYG laws. Lastly, I created an overall index of the impact of SYG across all of these states by taking the difference in the demand for firearms between each real and synthetic state, at each point in time.

[29] A table with the weights used to construct each synthetic control state can be found in Appendix A.

5 Results

5.1 North and South Carolina

Table 5 presents OLS estimates from my analysis of the Carolinas. The first row lists coefficients on the indicator of South Carolina during the treatment period. The subsequent rows list: 1) Coefficients on the indicator for South Carolina; 2) Coefficients on the indicator for the treatment period; and 3) the constants. The first three columns span a 37 month window—December, 2004 and December, 2007 (18 months before and after SYG). The next three columns span a shorter window—June 2005 through June 2007 (12 months before and after SYG). In both cases, coefficients on the indicator of South Carolina during the treatment period are positive, but not statistically significant. In other words, the enactment of a SYG law in South Carolina appears to have resulted in 3.5 more NICS background checks per 100,000 persons in a given month, but the estimates are not precise enough to rule out that the effect is zero. The inclusion of time fixed effects did not alter these results.

I performed a robustness check to determine whether including or omitting the first month of SYG would alter my results. I explored three coding schemes: 1) coding June, 2006 as one; 2) coding June, 2006 as zero; and 3) coding June, 2006 as .3 (the fraction of days the SYG law was in effect that month). Table 6 provides coefficients on the indicator of SYG from these analyses, which remain largely unchanged. These results suggest that different coding schemes had little effect on my results.

5.2 Statewide analysis

Table 7 presents OLS estimates of the impact of SYG law on NICS background checks from an analysis of the larger set of states. The first row provides coefficients on the indicator for SYG. Subsequent rows contain the following: coefficients for each of my control variables, the constant, whether time and state fixed effects are included, and the number of observations. Standard errors can be found below each coefficient in parenthesis. This analysis covers January 2000 through December 2012. The estimates in columns three and four omit Nebraska due to its unicameral legislature.[30]

The coefficients on SYG are positive and statistically significant in all columns, but the magnitude decreases, as more controls are included. The enactment of a SYG law is associated with approximately 27 more background checks per 100,000 persons in a given month.

Most coefficients on my controls are statistically significant, and have a sign that matches what I expected based on the conceptual model of demand for guns. With regards to coefficients for demographics, states that have a greater percentage of males, whites, non-Hispanics, and persons age 40-49 tend to have significantly more NICS background checks per capita. The coefficient controlling for the election of President Obama indicates that his election is associated with a significant increase in NICS

[30] Results do not significantly change when including Nebraska (and omitting the control for state legislature).

background checks. This is similar to findings by Chauvin (2014). This spike may reflect a response by gun owners to fears President Obama is "trying to take away Americans' guns."[31] Interestingly, coefficients on the state-level political environment tell two different stories. States with Democratic governors have a higher demand for firearms, but states with Democratic legislatures have a lower demand for firearms. Coefficients on indicators of violent crime are positive and significant, which indicate that increased criminal victimization is associated with increases in the number of NICS background checks per capita. Similarly, most coefficients on law enforcement are negative and significant, which is consistent with the predicted effects of collective security in my conceptual model. An exception is the coefficient on law enforcement, which is negative when state and time fixed effects are included, and contrary to my conceptual model.

In addition I test for differences in results when controlling for region or division, instead of state. Table 8 provides coefficients on SYG with alternate geographic controls. Coefficients on SYG remain positive and significant in all cases, which indicate that alternate geographic controls do not alter my results.

Next I perform a robustness check to test the impact of alternate coding of SYG—using the same coding variations I used in the robustness test of South Carolina.

Table 9 presents the results of this analysis, which indicate that coding the first effective month of SYG as one, zero, or the fraction of days does not impact my results.

[31] See the following article for more information: www.nytimes.com/2008/11/07/us/07guns.html

5.3 Synthetic Control Method

First, I present results from an application of the SCM in Florida: comparing real and synthetic Florida. This approach is identical to the SCM I used for the remaining SYG states. Florida is a particularly interesting case because its passage of a SYG law in 2005 foreshadowed a large number of states the enacted SYG laws in the succeeding years. Next I present results from an analysis of SYG overall: comparing differences between six of the real and synthetic states during years 2000 to 2008.

Florida

Figure 3 plots the demand for firearms in Florida and synthetic Florida. As exhibited by this figure, real and synthetic Florida exhibit similar trends in demand for firearms during the pre-treatment period, which indicates that synthetic Florida makes a strong counterfactual for real Florida in the absence of a SYG law. Following the passage of Florida's SYG law (in 2005), real Florida abruptly begins to outpace synthetic Florida in terms of its demand for firearms. These results indicate that Florida's SYG law led to a substantial increase in the demand for firearms. This is especially important, because Florida was one of the earliest states to enact a SYG law, and its SYG law generated much scrutiny in the wake of the shooting of Trayvon Martin.

All states

Figure 4 contains five graphs of demand for firearms between real and synthetic states for the other five treated states. As a whole, these plots resemble the trends found

in the previous figure between real and synthetic Florida. In most of these plots, demand for firearms in real and synthetic states trends similarly during the pretreatment period. Of these plots, real and synthetic Kansas bear closest resemblance during the pretreatment period, while real and synthetic Texas bear least resemblance during this period. However, following the enactment of SYG, demand for firearms in the real state begins to outpace demand in the synthetic one. Overall, these figures provide further evidence that the passage of SYG laws led to an increase in demand for firearms.

Furthermore, the coefficient on SYG in a regression of the form of equation (3), of the difference between each of these six real and synthetic states over this time period (2000-2008) returns a coefficient of *13.8*—both positive and statistically significant at the 1% level. This indicates that states that enacted a SYG law experienced 13.8 additional NICS background checks (per 100,000 population) each month, which is similar to the coefficient on SYG found in the previous analysis of 48 states.

6 Conclusions

This study investigated whether the passage of SYG laws led to an increase in the demand for firearms by using three separate difference in differences analyses. Results indicate that the passage of SYG laws led to a significant increase in the demand for firearms. Using monthly data on NICS background checks, I show that the passage of a SYG law in South Carolina led to an increase in the demand for firearms—though results from this analysis were not statistically significant. Analysis of 48 states produced more conclusive findings. Estimates from an analysis of 48 states indicate that SYG laws led to a statistically significant increase in the demand for firearms. Findings from the SCM paint a similar picture—especially in Florida and Kansas.

The implications of this study relate to the previous research on SYG laws, which have concluded that SYG laws lead to significantly more adverse firearm-related outcomes—e.g., homicides and injuries (Cheng & Hoekstra, 2012; McClellan & Tekin, 2012). This study may explain part of those findings. A greater demand for firearms might translate into greater gun ownership. As a consequence of greater gun ownership, more people may be at risk of accidental gun related injuries, or of being the victim of a homicide.

Of course, as with any research, this study has some limitations. It does not account for differences in firearms legislation across states (e.g., shall-issue permit laws). Such differences in state firearms legislation may, in part, explain some of the variation in the

demand for firearms over this period. Future research is also needed on the effects of different types of SYG laws. Do outcomes differ between full, partial, and case law SYG states? Do outcomes differ in states with SYG established via legal precedent rather than by legislation? These will add to a better understanding of the demand for firearms, and can help better inform firearm-related policy making.

References

Abadie, A., Diamond, A., & Hainmueller, J. (2011). Synth: An R Package for Synthetic Control Methods in Comparative Case Studies.

Abadie, A., & Gardeazabal, J. (2003). The economic costs of conflict: A case study of the Basque Country. *American economic review*, 113-132.

Association of Prosecuting Attorneys. (2012). Castle Doctrine Policy Statement.

Baxley, D. K. (2012). A Necessary Law, but Not in This Case. *The New York Times*. Retrieved from http://www.nytimes.com/roomfordebate/2012/03/21/do-stand-your-ground-laws-encourage-vigilantes/the-law-is-needed-but-not-in-this-case

Cao, L., Cullen, F. T., & Link, B. G. (1997). The Social Determinants of Gun Ownership: Self-Protection in an Urban Environment. *Criminology, 35*(4), 629-658.

Cheng, C., & Hoekstra, M. (2012). Does Strengthening Self-Defense Law Deter Crime or Escalate Violence? Evidence from Castle Doctrine: National Bureau of Economic Research.

Cook, P. J., Molliconi, S., & Cole, T. B. (1995). Regulating gun markets. *Journal of Criminal law and Criminology*, 59-92.

Cunningham, P. B., Henggeler, S. W., Limber, S. P., Melton, G. B., & Nation, M. A. (2000). Patterns and correlates of gun ownership among nonmetropolitan and rural middle school students. *Journal of Clinical Child Psychology, 29*(3), 432-442.

DeJong, C. (1997). Differential indicators of defensive weapon ownership: a comparison by genderPublications received. *Journal of Criminal Justice, 25*(6), 517-526.

Depetris-Chauvin, E. (2014). *Fear of Obama*. Department of Economics. Brown University. Retrieved from https://sites.google.com/site/emiliodepetrischauvin/

Dixon, J., & Lizotte, A. J. (1987). Gun Ownership and the" Southern Subculture of Violence". *American Journal of Sociology*, 383-405.

Dressler, J. (2006). *Understanding Criminal Law* (4 ed.): LexisNexis.

Edward L Glaeser, S. G. (1998). Who owns guns? Criminals, victims and the culture of violence: Harvard-Institute of Economic Research.

Glaeser, E. L., & Glendon, S. (1998). Who owns guns? Criminals, victims, and the culture of violence. *The American Economic Review, 88*(2), 458-462.

Green, S. P. (1999). Castles and carjackers: Proportionality and the use of deadly force in defense of dwellings and vehicles. *University of Illinois Law Review*(1), 1-41.

Hill, E. W. (2013). How Many Guns are in the United States: Americans Own between 262 Million and 310 Million Firearms.

Jeunesse, W. L. (2013). The Gun Debate: Lawmakers eye troubled background check system *Fox News*.

Jiobu, R. M., & Curry, T. J. (2001). Lack of Confidence in the Federal Government and the Ownership of Firearms. *Social Science Quarterly, 82*(1), 77-88.

Kleck, G. (2005). *Point blank: Guns and violence in America*: Transaction Publishers.

Kleck, G., & Kovandzic, T. (2009). City-Level Characteristics and Individual Handgun Ownership Effects of Collective Security and Homicide. *Journal of Contemporary Criminal Justice, 25*(1), 45-66.

Kleck, G., Kovandzic, T., Saber, M., & Hauser, W. (2011). The effect of perceived risk and victimization on plans to purchase a gun for self-protection. *Journal of Criminal Justice, 39*(4), 312-319.

Law Center to Prevent Gun Violence. (2013). 'Stand Your Ground' Policy Summary, from http://smartgunlaws.org/stand-your-ground-policy-summary/

Legault, R. L., & Lizotte, A. J. (2009). Caught in a Crossfire: Legal and Illegal Gun Ownership in America *Handbook on Crime and Deviance* (pp. 469-491): Springer.

Lizotte, A. J., & Bordua, D. J. (1980). Firearms ownership for sport and protection: Two divergent models. *American Sociological Review*, 229-244.

Lizotte, A. J., Bordua, D. J., & White, C. S. (1981). Firearms ownership for sport and protection: Two not so divergent models. *American Sociological Review, 46*(4), 499-503.

Lizotte, A. J., Tesoriero, J. M., Thornberry, T. P., & Krohn, M. D. (1994). Patterns of adolescent firearms ownership and use. *Justice Quarterly, 11*(1), 51-74.

Lott, J. R. (2013). *More guns, less crime: Understanding crime and gun control laws*: University of Chicago Press.

Testimony before the U.S. Senate Judiciary Committee's Subcommittee on the Constitution, Civil Rights, and Human Rights, Hearing on "'Stand Your Ground' Laws: Civil Rights and Public Safety Implications of the Expanded Use of Deadly Force" Sess. (2013).

Luxenburg, J., Cullen, F. T., Langworthy, R. H., & Kopache, R. (1994). Firearms and fido: Ownership of injurious means of protection. *Journal of Criminal Justice, 22*(2), 159-170.

Mayors Against Illegal Guns. (2013). Shoot First: 'Stand Your Ground' Laws and their Effect on Violent Crime and the Criminal Justice System.

McClellan, C. B., & Tekin, E. (2012). Stand Your Ground Laws, Homicides, and Injuries: National Bureau of Economic Research.

Mercy, J. A., & Rosenberg, M. L. (1998). Preventing firearm violence in and around schools. *Violence in American schools: A new perspective*, 159-187.

NICS. (2012). *NICS Operations 2012*. Retrieved from http://www.fbi.gov/about-us/cjis/nics/reports/2012-operations-report.

NRA. (2013). NRA Responds to Attacks on 'Stand Your Ground' Laws, from http://www.nraila.org/legislation/federal-legislation/2013/7/nra-responds-to-attacks-on-stand-your-ground-laws.aspx?s=&st=&ps=

Nugent-Borakove, S. J. M. E. (2007). Expansions to the Castle Doctrine: Implications for Policy and Practice: National District Attorneys Association.

O'Connor, J. F., & Lizotte, A. (1978). The" Southern Subculture of Violence" Thesis and Patterns of Gun Ownership. *Social Problems*, 420-429.

Ren, L., Zhang, Y., & Zhao, J. S. (2012). The Deterrent Effect of the Castle Doctrine Law on Burglary in Texas: A Tale of Outcomes in Houston and Dallas. *Crime & Delinquency*, 0011128712466886.

Small Arms Survey. (2011). Estimating Civilian Owned Firearms *Small Arms Survey Research Notes* (Vol. 9).

Smith, M. D. (1996). Sources of firearm acquisition among a sample of inner-city youths: research results and policy implications. *Journal of Criminal Justice, 24*(4), 361-367.

Wilkinson, D. L., McBryde, M. S., Williams, B., Bloom, S., & Bell, K. (2009). Peers and Gun Use Among Urban Adolescent Males An Examination of Social Embeddedness. *Journal of Contemporary Criminal Justice, 25*(1), 20-44.

Young, R. L., McDowall, D., & Loftin, C. (1987). Collective security and the ownership of firearms for protection. *Criminology, 25*(1), 47-62.

Tables

Table 1: States with full Stand Your Ground laws

State	Date	Source
Alabama	6/1/2006	Ala. Code § 13A-3-23
Alaska	9/18/2013	Alaska Stat. § 11.81.335
Arizona	4/24/2006	Ariz. Rev. Stat. § 13-411
Florida	10/1/2005	Fla. Stat. § 776.013
Georgia	7/1/2006	Ga. Code. § 16-3-23.1
Indiana	7/1/2006	Ind. Code § 35-41-3-2
Kansas	7/1/2006	Kan. Stat. § 21-5230
Kentucky	7/12/2006	Ky. Rev. Stat. § 503.055
Louisiana	8/15/2006	La. Rev. Stat. § 14:20
Michigan	10/1/2006	Mich. Comp. Laws § 780.972
Mississippi	7/1/2006	Miss. Code § 97-3-15
Montana	4/27/2009	Mont. Code § 45-3-110
Nevada	10/1/2011	Nev. Rev. Stat. § 200.120
New Hampshire	11/13/2011	N.H. Rev. Stat. § 627:4
North Carolina	12/1/2011	N.C. Gen. Stat. § 14-51.3
Oklahoma	11/1/2011	21 Okla. Stat. § 1289.25
Pennsylvania	8/27/2011	18 Pa. Cons. Stat. § 505
South Carolina	6/9/2006	S.C. Code § 16-11-440
South Dakota	2/17/2006	SDCL § 22-18-4
Tennessee	5/22/2007	Tenn. Code 39-11-611
Texas	9/1/2007	Tex. Penal Code § 9.31
Utah	3/2/1994	Utah Code § 76-2-402
West Virginia	2/28/2008	W. Va. Code § 55-7-22

Table 2: States with partial Stand Your Ground laws

State	Year	Source
Alaska	2006	Alaska Stat. § 11.81.335
Connecticut	1992	Conn. Gen. Stat. § 53a-19
Delaware	1995	Del. Code tit. 11, § 4-465
Hawaii	2001	Haw. Rev. Stat. § 703-304
Iowa	1997	Iowa Code § 704.1
Louisiana	1997	La. Rev. Stat. § 14:20
Missouri	2007	Mo. Rev. Stat. § 563.031
Nebraska	1975	Neb. Rev. Stat. § 28-1409
North Dakota	2007	N.D. Cent. Code § 12.1-05-07
Ohio	2008	Ohio Rev. Code § 2901.09
Oklahoma	2006	21 Okla. Stat. § 1289.25
Wisconsin	2011	Wis. Stat. § 939.48

Table 3: Summary statistics of controls

	Mean	SD
Male	0.49	0.01
Black	0.10	0.10
Other race	0.08	0.10
Non-Hispanic	0.90	0.10
Age <30	0.41	0.03
Age 30-39	0.13	0.01
Age 50-59	0.13	0.01
Age 60+	0.18	0.02
Bachelor degree or higher	0.26	0.05
High school degree or higher	0.86	0.04
Obama elected	0.32	0.47
Governor (Democrat)	0.47	0.50
State House (% Democrat)	0.52	0.16
Law enforcement (per 1,000)	3.07	0.62
Violent Crime (per 100,000)	394	170
Unemployment (%)	5.83	2.15
Personal income	35.87	6.89

Table 4: Demographic comparison between North and South Carolina

	North Carolina	South Carolina
Population total	8,856,505	4,321,249
Land area (square miles)	48,617	30,060
Persons per square mile	182	144
White	71.4%	68.5%
Black	22.1%	29.4%
American Indian And Alaska Native	1.7%	0.7%
Asian	2.1%	1.3%
Other Race	4.1%	1.4%
Hispanic	6.7%	3.4%
Not Hispanic	93.3%	96.6%
Male	49.0%	48.7%
Female	51.0%	51.3%
Under 20 years	27.2%	27.2%
20 to 34 years	20.3%	19.8%
35 to 54 years	29.3%	28.7%
55 to 74 years	17.5%	18.6%
75 years and over	5.6%	5.8%
High school degree or higher[1]	82.0%	81.3%
Bachelor's degree or higher[1]	24.8%	22.7%
Median household income	$42,625	$41,100
Mean household income	$57,184	$55,128
Unemployment	6.6%	7.4%
Percent below poverty level[2]	14.7%	15.7%

Source: 2006 American Community Survey

Notes:
1 Population over 25
2 Percent of families and persons (in the past 12 months)

Table 5: OLS estimates of SYG on background checks in South Carolina

	NICS (37 months)			NICS (25 months)		
	(1)	(2)	(3)	(4)	(5)	(6)
S. Carolina Post	3.5	3.5	3.5	5.6	5.6	5.6
	(38.8)	(6.0)	(7.0)	(36.3)	(6.0)	(6.8)
S. Carolina	13.9	13.9***	13.9***	10.8	10.8**	10.8**
	(28.9)	(4.9)	(4.9)	(29.0)	(4.4)	(4.3)
Post	2.4	1.6	-8.1	-7.7	-2.1	-10.1
	(27.5)	(5.1)	(6.4)	(28.6)	(4.5)	(8.7)
Constant	268.6***	269.1***	251.6***	270.7***	283.3***	275.0***
	(21.4)	(9.4)	(19.8)	(21.9)	(7.3)	(9.2)
Month effects	No	Yes	Yes	No	Yes	Yes
Year effects	No	No	Yes	No	No	Yes

* p<0.10 ** p<0.05 *** p<0.01

Standard errors in parentheses

Source: FBI NICS (December 2004 - December 2007)

Table 6: Robustness check on indicator of SYG in South Carolina

	NICS (37 months)			NICS (25 months)		
All of June	3.477	3.477	3.477	5.582	5.582	5.582
	(35.80)	(6.360)	(5.614)	(36.26)	(5.984)	(6.750)
Fraction of June	-5.689	4.730	3.828	-7.281	7.218	6.342
	(29.93)	(6.176)	(6.573)	(43.95)	(7.179)	(6.176)
None of June	-8.395	5.224	3.600	-11.29	7.596	5.516
	(38.68)	(6.210)	(6.262)	(45.16)	(4.634)	(4.052)
Month effects	No	Yes	Yes	No	Yes	Yes
Year effects	No	No	Yes	No	No	Yes

* p<0.10 ** p<0.05 *** p<0.01

Standard errors in parentheses

Source: FBI NICS (December 2004 - December 2007)

Table 7: OLS estimates of SYG on NICS background checks in all states

	NICS			
	(1)	(2)	(3)	(4)
Stand your ground	134.3***	68.59***	41.99***	27.48***
	[6.551]	[6.479]	[5.064]	[4.657]
Male			15309.3***	5434.5***
			[511.9]	[1878.9]
Black			-162.0***	-664.7
			[34.43]	[443.0]
Other race			-615.1***	2923.9***
			[17.89]	[453.1]
Non-Hispanic			596.4***	1618.6***
			[28.57]	[375.5]
Age <30			3061.2***	6022.1***
			[311.2]	[848.2]
Age 30-39			-2416.0***	3352.5***
			[407.9]	[462.4]
Age 50-59			7672.2***	3534.8***
			[526.3]	[647.4]
Age 60+			1726.8***	3805.0***
			[296.7]	[553.7]
College			456.2***	-400.2**
			[74.23]	[198.1]
High school			-1914.0***	-212.7
			[104.5]	[183.4]
Obama			99.20***	85.64***
			[14.34]	[10.31]
Governor			18.73***	2.398
			[3.061]	[2.652]
State House			-28.72*	-121.1***
			[14.83]	[22.04]
Law enforcement			-13.33***	19.76***
			[3.155]	[5.807]
Violent Crime			0.0713***	0.0878***
			[0.0125]	[0.0314]
Unemployment			-15.36***	-3.949**
			[1.321]	[1.552]
Personal income			-3.515***	0.197
			[0.523]	[1.098]
Constant	336.7***	262.7***	-8174.9***	-8428.5***
	[2.603]	[10.45]	[335.1]	[896.4]
Month and year	No	Yes	Yes	Yes
State	No	No	No	Yes
Observations	7488	7488	7320	7320

* p<0.10 ** p<0.05 *** p<0.01

Standard errors in brackets

Source: NICS (January 2000 - December 2012)

Table 8: OLS coefficients of SYG on NICS background checks by geographic unit

	NICS		
	State	Division	Region
Stand your ground	27.48***	44.09***	47.94***
	[4.657]	[4.888]	[4.996]
Male	5434.5***	10714.6***	10736.4***
	[1878.9]	[592.6]	[587.5]
Black	-664.7	-408.1***	-383.4***
	[443.0]	[40.53]	[38.71]
Other race	2923.9***	-538.3***	-663.6***
	[453.1]	[21.85]	[18.01]
Non-Hispanic	1618.6***	760.9***	720.3***
	[375.5]	[32.51]	[31.70]
Age <30	6022.1***	1034.9***	2357.5***
	[848.2]	[341.7]	[339.3]
Age 30-39	3352.5***	-3078.6***	-3751.3***
	[462.4]	[418.6]	[423.9]
Age 50-59	3534.8***	6259.6***	5829.9***
	[647.4]	[548.3]	[557.6]
Age 60+	3805.0***	156.3	646.1**
	[553.7]	[312.8]	[315.0]
College	-400.2**	580.5***	194.3**
	[198.1]	[79.30]	[75.98]
High school	-212.7	-2016.4***	-1749.9***
	[183.4]	[123.5]	[122.5]
Obama	85.64***	93.41***	102.8***
	[10.31]	[13.67]	[14.14]
Governor	2.398	11.93***	10.66***
	[2.652]	[3.070]	[3.096]
State House	-121.1***	-89.05***	-23.54
	[22.04]	[16.01]	[14.79]
Law enforcement	19.76***	-40.66***	-9.677***
	[5.807]	[3.388]	[3.127]
Violent Crime	0.0878***	0.0761***	0.0445***
	[0.0314]	[0.0126]	[0.0129]
Unemployment	-3.949**	-8.309***	-15.85***
	[1.552]	[1.560]	[1.462]
Personal income	0.197	1.608***	-0.222
	[1.098]	[0.581]	[0.569]
Constant	-8428.5***	-4720.4***	-5330.3***
	[896.4]	[410.6]	[409.8]
Month and year	Yes	Yes	Yes
Observations	7320	7320	7320

* p<0.10 ** p<0.05 *** p<0.01

Standard errors in brackets

Source: NICS (January 2000 - December 2012)

Table 9: Robustness check on indicator of SYG in all states

	NICS			
	(1)	(2)	(3)	(4)
All of month	134.3***	68.59***	41.99***	27.48***
	[6.551]	[6.479]	[5.064]	[4.657]
Fraction of month	138.9***	64.16***	45.12***	22.27***
	[7.446]	[7.287]	[5.544]	[5.234]
None of month	135.3***	68.53***	42.60***	28.21***
	[6.596]	[6.528]	[5.089]	[4.672]
Month and year	No	Yes	Yes	Yes
Exogenous controls	No	No	Yes	Yes
State	No	No	No	Yes
Observations				

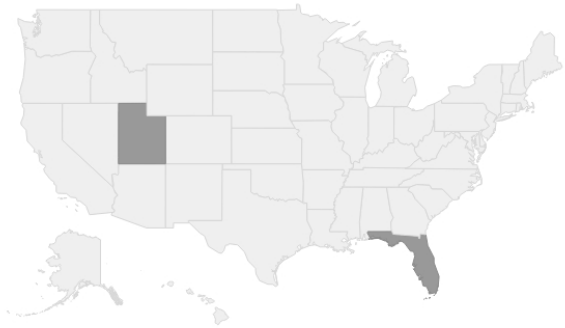
* p<0.10 ** p<0.05 *** p<0.01

Standard errors in brackets

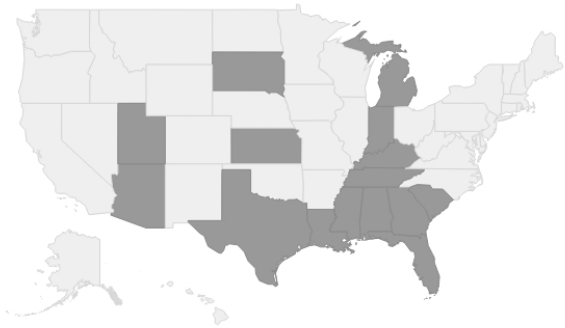
Source: NICS (January 2000 - December 2012)

Figures

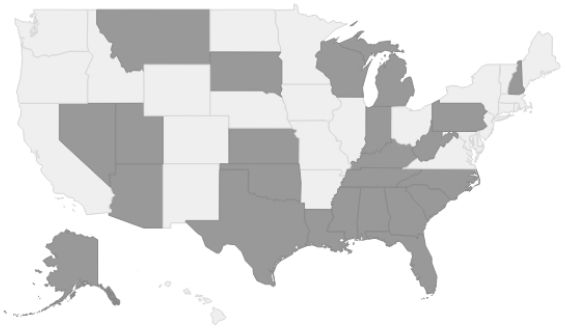
Figure 1: States with full SYG laws by year



2005



2007



2013

Figure 2: NICS background checks (per capita) in North Carolina and South Carolina

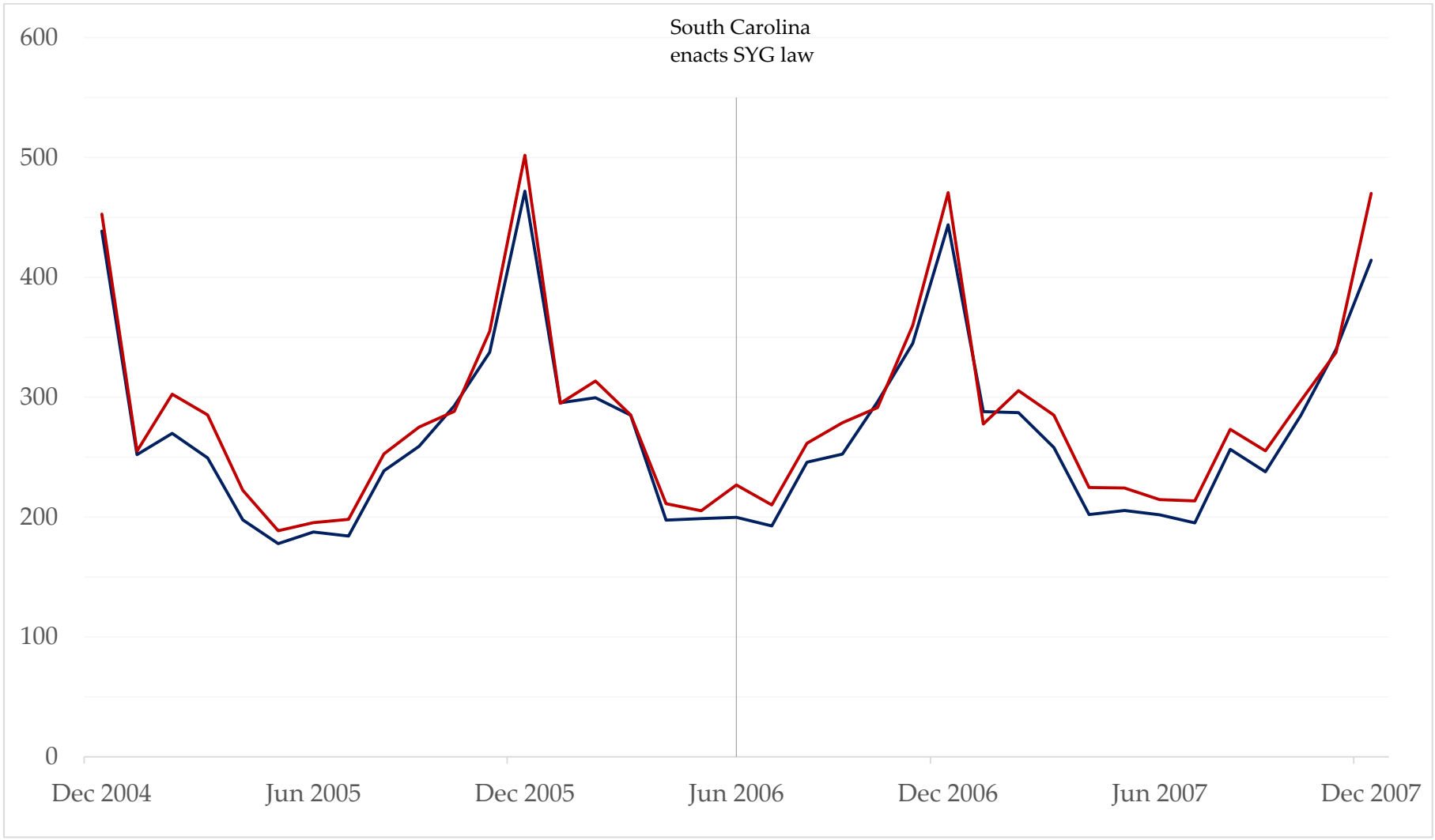


Figure 3: Graph of NICS per capita for Florida and Synthetic Florida

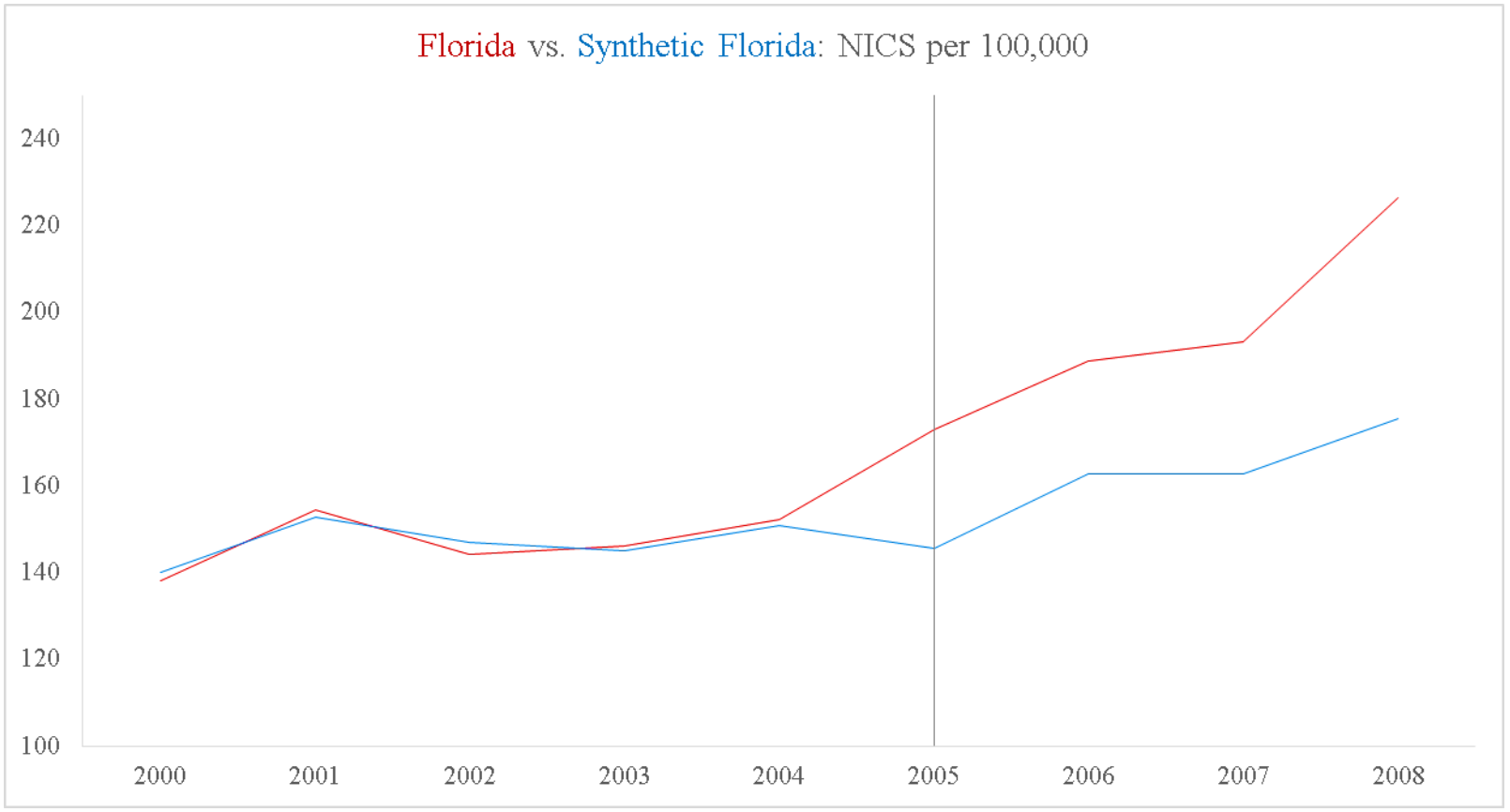
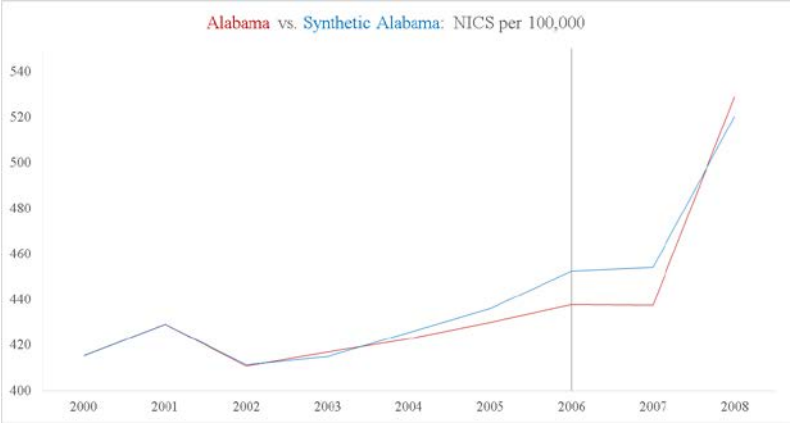
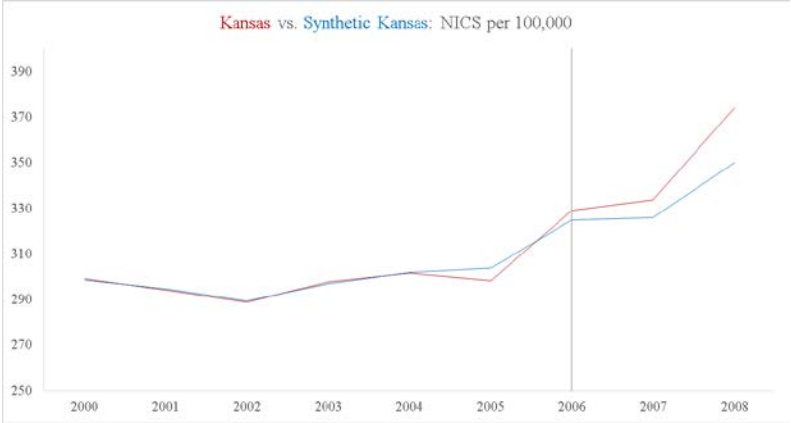
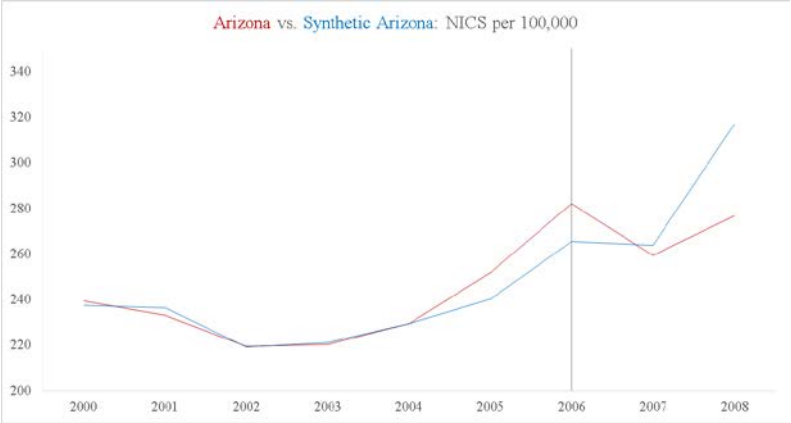
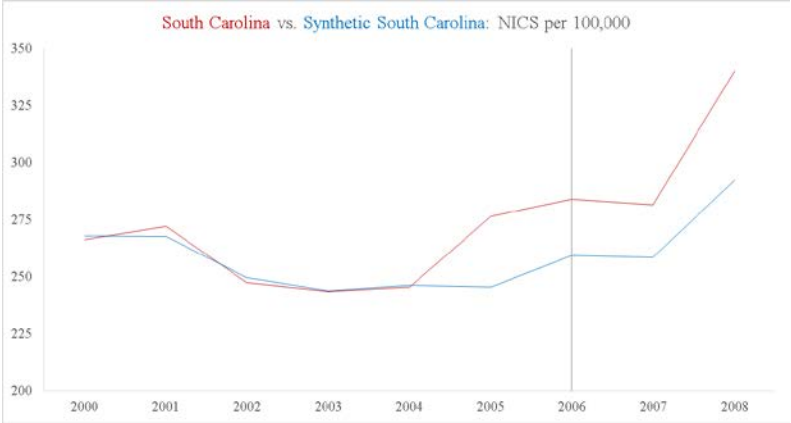


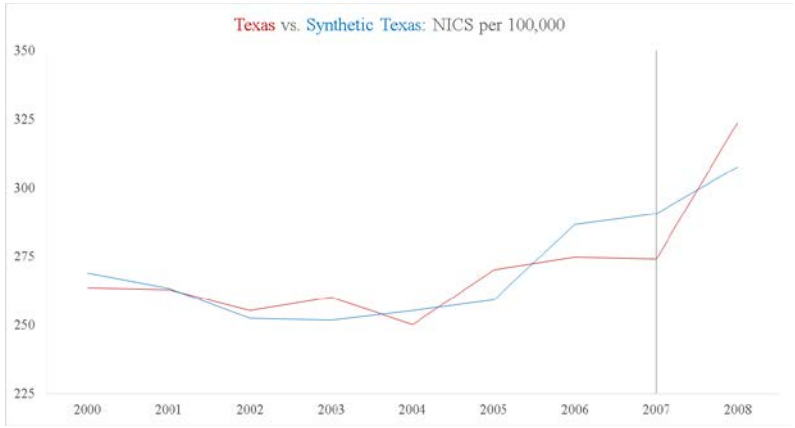
Figure 4: Graphs of NICS per capita for real and synthetic control states










Texas vs. Synthetic Texas: NICS per 100,000
350
325
300
275
250
225
2000
2001
2002
2003
2004
2005
2006
2007
2008

Appendix A

Synthetic Control Weights

Alabama

State	Weight
Alaska	0.020
Arkansas	0.120
Missouri	0.160
North Carolina	0.100
North Dakota	0.040
Oklahoma	0.400
West Virginia	0.170

Arizona

State	Weight
California	0.002
Iowa	0.001
North Dakota	0.111
New Jersey	0.024
New Mexico	0.202
Nevada	0.478
New York	0.100
Rhode Island	0.083

Florida

State	Weight
Maine	0.307
New York	0.693

Kansas

State	Weight
Iowa	0.171
Idaho	0.390
Illinois	0.130
Nebraska	0.039
New Jersey	0.234
Washington	0.036

South Carolina

State	Weight
Maryland	0.431
North Carolina	0.167
New Mexico	0.371
West Virginia	0.031

Texas

State	Weight
Idaho	0.416
Illinois	0.071
Maryland	0.08
New York	0.433